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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/669,055	09/24/2003	Yoshiaki Noda	NOG-0017	3382
23353	7590	08/23/2005	EXAMINER	
RADER FISHMAN & GRAUER PLLC LION BUILDING 1233 20TH STREET N.W., SUITE 501 WASHINGTON, DC 20036			ARANCIBIA, MAUREEN GRAMAGLIA	
			ART UNIT	PAPER NUMBER
			1763	

DATE MAILED: 08/23/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/669,055

Applicant(s)

NODA ET AL.

Examiner

Maureen G. Arancibia

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 09 June 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-18 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-18 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. **Claims 1-5 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent 4,511,593 to Brandolf in view of U.S. Patent 4,964,962 to Nobutani et al.**

Brandolf teaches a plasma processing device comprising: a chamber 20; a process target 30; an exhaust mechanism 22 that lowers the chamber pressure below atmospheric pressure (Column 6, Lines 43-44); an active electrode 40C and a plate electrode 60, located opposite one another (Figures 1 and 4); a plasma generating power supply 48' connected to the active electrode for use in generating the plasma (Column 10, Lines 4-8; Figure 4); and an electrically conductive path connected to the target 30 via target holder 23 (Figure 1). The target is disposed outside the space between the two electrodes. (Figure 1)

Note that the recitation of intended use of the claimed apparatus for cleaning has been considered, but does not have patentable weight. See MPEP § 2114. The apparatus taught by Brandolf would be capable of cleaning the process target.

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Brandolf does not expressly teach a process gas introducing mechanism or that the plate electrode 60 is grounded.

Nobutani teaches a process gas introducing mechanism 32 and a grounded plate electrode 25.

It would have been obvious to one of ordinary skill in the art to modify the apparatus taught by Brandolf to have a process gas introducing mechanism and to ground the plate electrode. The motivation for using a process gas introducing mechanism would have been to allow control of the amount of processing material that is supplied to the chamber, rather than providing it in solid form. The motivation for grounding the plate electrode, as taught by Nobutani (Column 9, Lines 54-56), would have been to allow the electrode to better contain the plasma between itself and the active electrode, thereby better accomplishing the goals of Brandolf (Column 11, Line 45-Column 12, Line 54)

In regards to Claim 2, Brandolf teaches that the target 30 is disposed at the other side of the plate electrode 60 from the active electrode 40C. (Figure 1)

In regards to Claim 3, the electrically conductive path is provided with an auxiliary power supply 47.

In regards to Claims 4 and 5, the auxiliary power supply 47 is a variable DC power supply (*variable bias*).

In regards to Claim 16, the particular type of gas used is a process limitation rather than an apparatus limitation, and the recitation of a particular type of gas does not limit an apparatus claim, see *In re Casey*, 152 USPQ 235; *In re Rishoi*, 94 USPQ

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71; *In re Young*, 25 USPQ 69; *In re Dulberg*, 129 USPQ 348; *Ex parte Thibault*, 64 USPQ 666; and *Ex parte Masham*, 2 USPQ2d 1647. This rejection is based on the fact the apparatus structure taught by the combination of Brandolf and Nobutani has the inherent capability of being used in the manner intended by the Applicant. When a rejection is based on the inherency, a rejection under 35 U.S.C. 102 or U.S.C. 103 is appropriate. (See *In re Fitzgerald* 205 USPQ 594 or MPEP § 2112).

3. Claim 6 and 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over Brandolf in view of Nobutani as applied to Claims 1-3 above, and further in view of U.S. Patent 6,178,919 to Li et al.

The teachings of Brandolf and Nobutani were discussed above.

In regards to Claim 6, the combination of Brandolf and Nobutani does not expressly teach that the auxiliary power supply can be AC.

Li et al. teaches that an auxiliary power supply 212 can be AC. (Column 4, Lines 62-64)

It would have been obvious to one of ordinary skill in the art to make the auxiliary power supply taught by the combination of Brandolf and Nobutani an AC power supply. The motivation for doing so, as taught by Li et al. (Column 3, Lines 41-42), would have been to aid in accelerating ions toward the substrate to be etched.

In regards to Claim 13, the combination of Brandolf and Nobutani does not expressly teach an insulating cover disposed in the chamber, covering the pair of opposite electrodes and process target, and having an opening to allow flow of the process gas.

Li et al. teaches that an insulating cover can be provided in a plasma chamber to confine the plasma to a specific volume, and dimensioned according to the volume needed. (Column 7, Lines 60-63)

It would have been obvious to one of ordinary skill in the art to provide an insulating cover in the chamber taught by the combination of Brandolf and Nobutani. The motivation for doing so, as taught by Li et al. (Column 7, Lines 63-66), would have been to control the volume of the plasma, making etching more uniform. The motivation for making it of a size to cover the pair of opposite electrodes and the target taught by the combination of Brandolf and Nobutani would have been to contain the plasma within this crucial volume of the chamber. The motivation for providing an opening for the flow of process gas would have been to allow the process gas to reach the plasma electrodes.

4. Claims 7-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Brandolf in view of Nobutani as applied to Claim 3 above, and further in view of U.S. Patent 4,792,727 to Godyak.

The teachings of Brandolf and Nobutani were discussed above.

The combination of Brandolf and Nobutani does not teach a resistor, diode, or both connected in series between the auxiliary power supply and process target, the diode oriented such that the process target side is the anode.

Godyak teaches that a diode D1 and resistor R1 can be provided in series between an auxiliary power supply 13 and an electrode A. (Figure 1)

It would have been obvious to one of ordinary skill in the art to provide a diode and resistor in series with the auxiliary power supply taught by the combination of Brandolf and Nobutani, with the diode oriented such that the process target side is the anode. The motivation for providing the resistor would have been to control the amount of current provided to the process target. The motivation for providing a diode, as taught by Godyak (Column 2, Line 30), would have been that it is a unilateral conducting means; in other words, providing a diode allows the target to be biased. The motivation for orienting the diode such that the process target side is the anode would have been to increase the attraction of positively charged ions in the plasma to the target.

5. Claims 10-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Brandolf in view of Nobutani as applied to Claim 3 above, and further in view of Japanese Unexamined Patent Application Publication 62-267483 to Ito et al. The following rejection refers to the English abstract and Figures Ito et al.

The teachings of Brandolf and Nobutani were discussed above.

The combination of Brandolf and Nobutani does not expressly teach that the auxiliary power supply can be provided with a protective circuit comprising a resistor and capacitor in parallel to each other and the auxiliary power supply.

Ito et al. teaches that an auxiliary power source 10 can be provided with a parallel circuit of a resistor 9 and a capacitor 12 in parallel with each other. (Figure 1)

It would have been obvious to one of ordinary skill in the art to modify the combination of Brandolf and Nobutani to include a parallel circuit of a resistor and

capacitor in parallel to each other and the auxiliary power supply. The motivation for doing so, as taught by Ito et al. (English abstract, Purpose) would have been to provide an auxiliary power circuit that prevents the substrate from being damaged.

6. Claim 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over Brandolf in view of Nobutani as applied to Claims 1 and 2 above, and further in view of U.S. Patent 4,282,077 to Reavill.

The teachings of Brandolf and Nobutani were discussed above. Note that Brandolf teaches that the process target is connected to an electrically conductive path, as discussed above.

The combination of Brandolf and Nobutani does not expressly teach plural sets of the pair of electrodes and process target can be provided in a partitioned chamber.

Reavill teaches a partitioned plasma chamber 36 with plural sets of opposite electrodes and process targets (76, 78, 80, 82). (Figure 2) The active electrodes are connected in parallel. (Figure 2) Each of the subspaces is individually controllable. (Column 3, Lines 11-13)

It would have been obvious to one of ordinary skill in the art to modify the apparatus taught by the combination of Brandolf and Nobutani to include plural sets of opposite electrodes and process targets, as taught by Reavill, with each subspace being individually controlled. The motivation for including plural sets of electrodes and targets would have been to increase apparatus throughput. The motivation for connecting the active electrodes in parallel would have been to use a single power supply to drive them. The motivation for making each subspace individually controlled,

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as taught by Reavill (Column 3, Lines 14-16), would have been to make the etching of each target more uniform.

7. Claim 15 is rejected under 35 U.S.C. 103(a) as being unpatentable over Brandolf in view of Nobutani and further in view of Reavill as applied to claim 14 above, and further in view of Japanese Patent 2574852B2 (Japanese '852). The following rejection refers to the figures of Japanese '852.

The teachings of Brandolf, Nobutani, and Reavill were discussed above. Specifically, the combination of Brandolf, Nobutani, and Reavill teaches that the active electrodes are connected in parallel with each other. (See discussion of Claim 14 above.)

The combination of Brandolf, Nobutani, and Reavill does not expressly teach that each active electrode should be provided with a corresponding resistor.

Japanese '852 teaches that electrodes 11, 11a, 11c connected in parallel to each other and supplied with a power source 7 should each be provided with corresponding resistors 8b, 8a, 8c. (Figure 1)

It would have been obvious to one of ordinary skill in the art to modify the apparatus taught by the combination of Brandolf, Nobutani, and Reavill to provide each electrode with a corresponding resistor. The motivation for doing so would have been to individually optimize the current flow to each electrode while only having to provide one power source.

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8. Claim 17 is rejected under 35 U.S.C. 103(a) as being unpatentable over Brandolf in view of Nobutani as applied to Claims 1 and 2 above, and further in view of U.S. Patent 5,203,958 to Arai et al.

The teachings of Brandolf and Nobutani were discussed above.

The combination of Brandolf and Nobutani does not expressly teach that the inlet port for the process gas can be provided to the vent pipe of the chamber.

Arai et al. teaches that an inlet port 17 can be provided to a vent pipe 19.

It would have been obvious to one of ordinary skill in the art to modify the apparatus taught by the combination of Brandolf and Nobutani to provide the inlet port to the vent pipe for the chamber. The motivation for doing so, as taught by Arai et al. (Column 5, Lines 40-42), would have been to constantly maintain the interior of the vented space (i.e. the chamber) at a predetermined pressure)

9. Claim 18 is rejected under 35 U.S.C. 103(a) as being unpatentable over Brandolf in view of Nobutani as applied to Claims 1 and 2 above, and further in view of U.S. Patent 4,624,767 to Obinata.

The teachings of Brandolf and Nobutani were discussed above.

The combination of Brandolf and Nobutani does not expressly teach a reflecting electrode in an electrically floating state at the other side of the active electrode from the earth electrode.

Obinata teaches an electrically floating reflecting electrode 9. (Column 2, Lines 41-50)

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It would have been obvious to one of ordinary skill in the art to provide the apparatus taught by the combination of Brandolf and Nobutani with an electrically floating reflecting electrode, positioned on the far side of the active electrode. The motivation for making this modification, as taught by Obinata (Column 2, Lines 45-54), would have been to help contain the plasma in the space between the active electrode and the earth electrode and target, without having to supply additional power to the active electrode.

Response to Arguments

10. Applicant's arguments filed 9 June 2005 have been fully considered, but to the extent that they still apply in view of the new ground(s) of rejection, they are not persuasive.

In response to applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

Conclusion

11. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

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A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Maureen G. Arancibia whose telephone number is (571) 272-1219. The examiner can normally be reached on core hours of 10-5, Monday-Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Parviz Hassanzadeh can be reached on (571) 272-1435. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Maureen G. Arancibia
Patent Examiner, AU 1763

P.L.

**PARVIZ HASSANZADEH
SUPERVISORY PATENT EXAMINER**